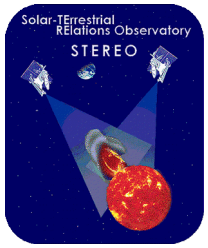


The STEREO Space Weather Broadcast

O.C. St.Cyr (CUA)

V. Pizzo, R. Zwickl, E. Hildner (NOAA/SEC)

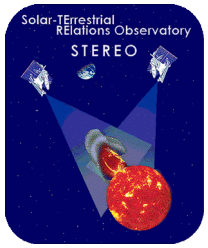
J.M. Davila, M.L. Kaiser (NASA-GSFC)

R. Howard (NRL)

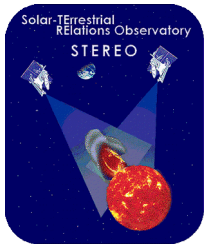
J.G. Luhmann (UC-Berkeley)

A. Galvin (UNH)

J.-L. Bougeret (Meudon)



- **<u>STEREO's Primary Science Goal</u>**
- **To understand the three-dimensional structure of the Sun's corona, especially regarding the origin of CMEs, their evolution in the interplanetary medium, and their dynamic coupling with Earth's environment**

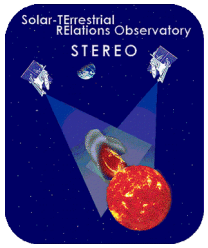


The NASA STEREO mission offers exciting possibilities for near-real-time transmission of important measurements for space weather. The STEREO payload will provide solar wind plasma, magnetic field, and energetic particle parameters, as well as optical and radio views of the Sun that cannot be obtained from groundbased observers or spacecraft near Earth. This space weather data will be transmitted continuously from each spacecraft over the X-band frequency range at a data rate of about 500 bps. Processing of the space weather broadcast data into useful online displays will be performed at the STEREO Science Center located at Goddard Space Flight Center. NASA will provide for partial coverage from each spacecraft through the Deep Space Network, and we are looking for partners who have ground stations to provide complementary coverage. We anticipate that these data will be very useful to forecasters of space environment conditions.

STEREO Space Weather Broadcast

Instrument Name and Collaborating Institutions	Measurement and Proposed Space Weather Broadcast Content
IMPACT (*In situ* Measurement of Particles and CME Transients) *Principal Investigator: Dr. J. G. Luhmann, University of California, Berkeley,* NASA-GSFC, Caltech, U. Md, U. Kiel,CESR, MPAe, JPL, ESTEC, UCLA, NOAA, LANL, et al.	Solar wind plasma characteristics; magnetic field parameters; solar energetic particles One minute average solar wind electron fluxes (6 energy bands); magnetic field strength and direction; energetic electron, proton, ion (He,CNO,Fe) fluxes (multiple bands)
PLASTIC (PLAsma and SupraThermal Ion and Composition) *Principal Investigator: Dr. A. B. Galvin* *University of New Hampshire* University of Bern, MPE-Garching, et al.	Ions in the energy-per-charge range of 0.2 to 100 keV/e One minute average solar wind proton density, bulk speed, thermal speed, and direction; alpha density; representative charge (or abundance) state distributions; suprathermal rates
SECCHI (Sun-Earth Connection Coronal and Heliospheric Investigation) *Principal Investigator: Dr. R. A. Howard* *Naval Research Laboratory, Washington, D.C.* Lockheed-Martin Solar and Astrophysics Lab, NASA-GSFC, University of Birmingham (U.K.), IAS, RAL, MPAe, U. Kiel, CSL, et al.	EUV imager, two coronagraphs with overlapping fields of view; two heliospheric imagers with overlapping fields of view 256x256 pixel highly compressed images from EUVI, COR1, COR2, HI1, HI2
SWAVES (STEREO/WAVES) *Principal Investigator: Dr. J.-L. Bougeret* *CNRS, Observatoire de Paris*, University of Minnesota, UC Berkeley, NASA-GSFC	Interplanetary radio bursts from 40 kHz to 16 MHz One minute average radio dynamic spectrum (Intensity, frequency, time)

STEREO Project Status



- Phase A concept study completed
- Phase B detailed design underway

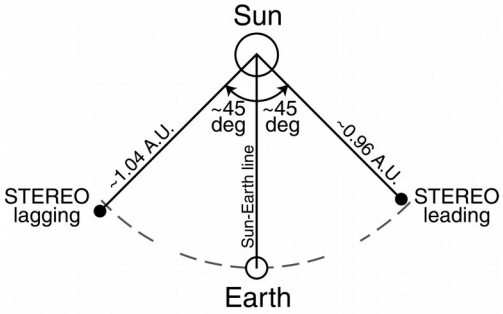
- Preliminary Design Review (Sep 2001)
- Critical Design Review (June 2002)
- Launch (Dec 2004)
- Nominal 2 year (+90 days) mission
- Design lifetime 5 years

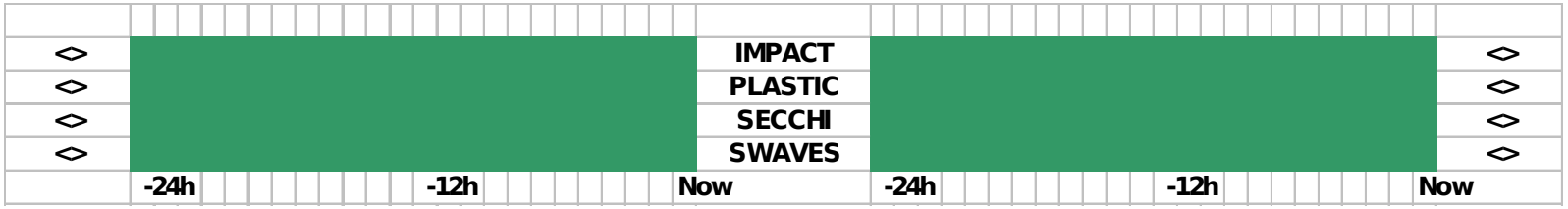
STEREO Space Weather Broadcast

- **NASA provides 4 hours coverage per day per spacecraft through DSN**
- **Potential Antenna Partners**
  - **U.C. Berkeley**
  - **Rutherford Appleton Labs (U.K.)**
  - **CNES (France and Kouru)**
  - **CRL (Japan)**
  - **ESOC/ESA**

STEREO Space Weather Broadcast

(Draft web page showing data coverage)

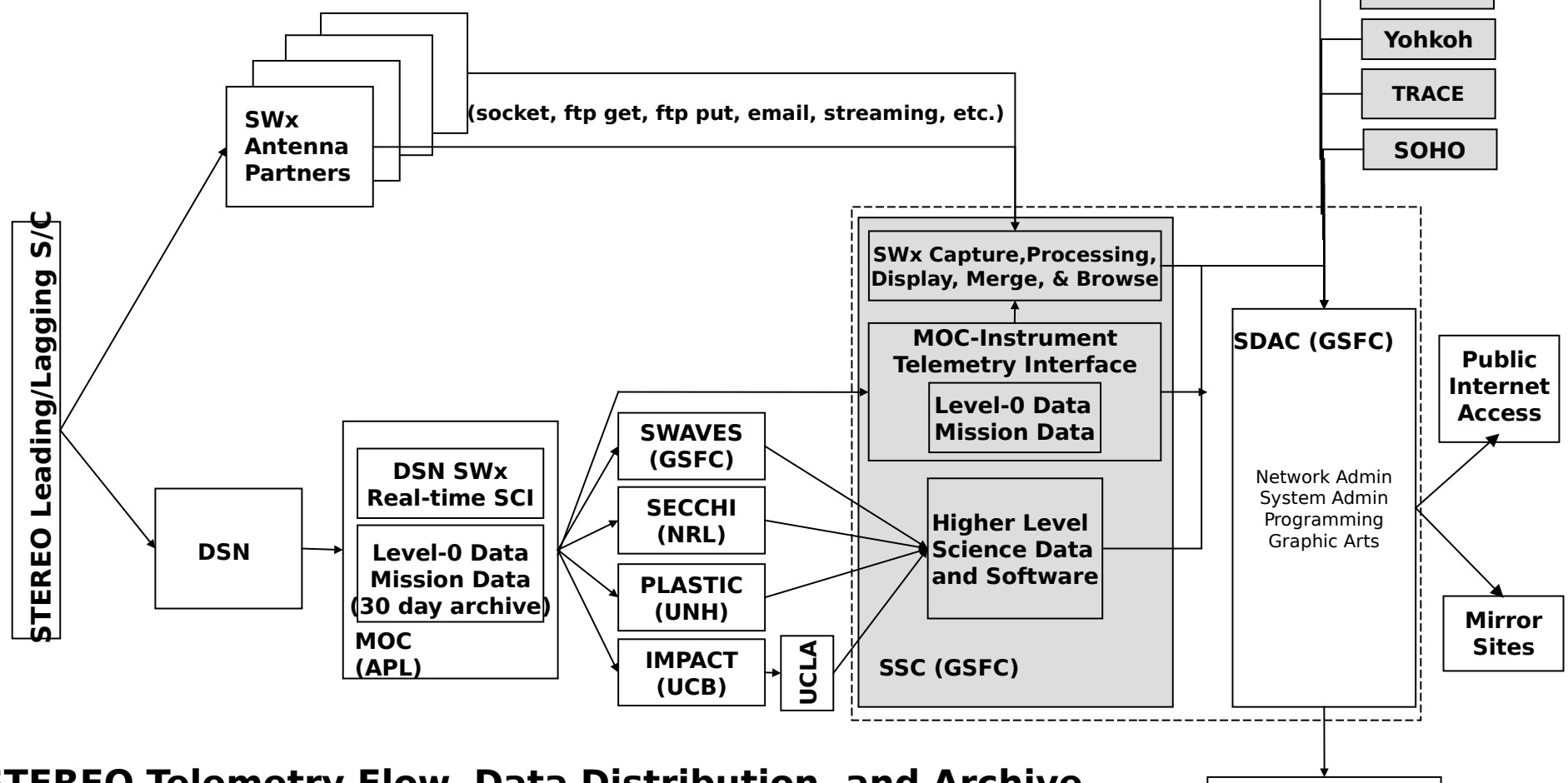




<GET ARCHIVE DATA>

CStCyr--May2001

STEREO Space Weather Broadcast



STEREO Telemetry Flow, Data Distribution, and Archive

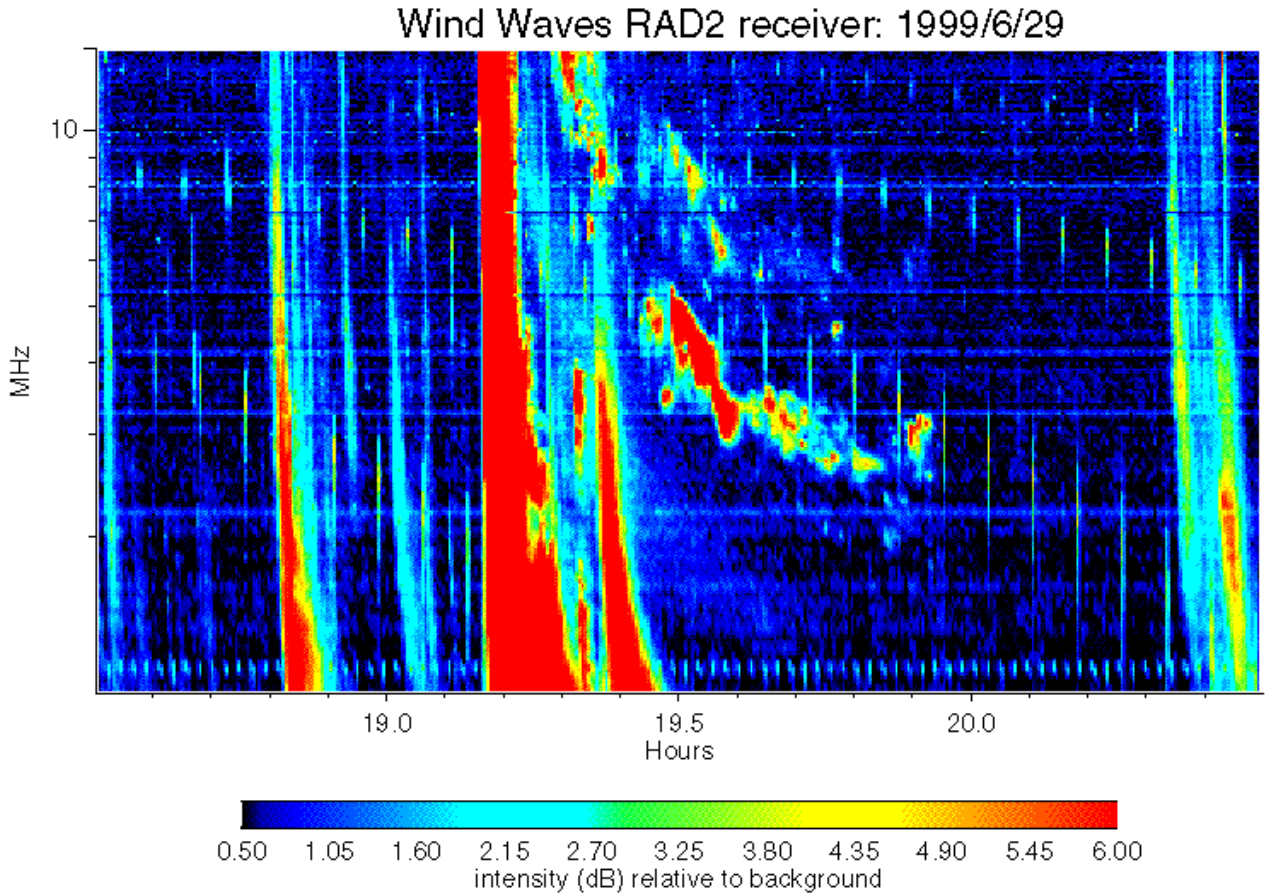
CStCyr--May2001

STEREO Space Weather Broadcast

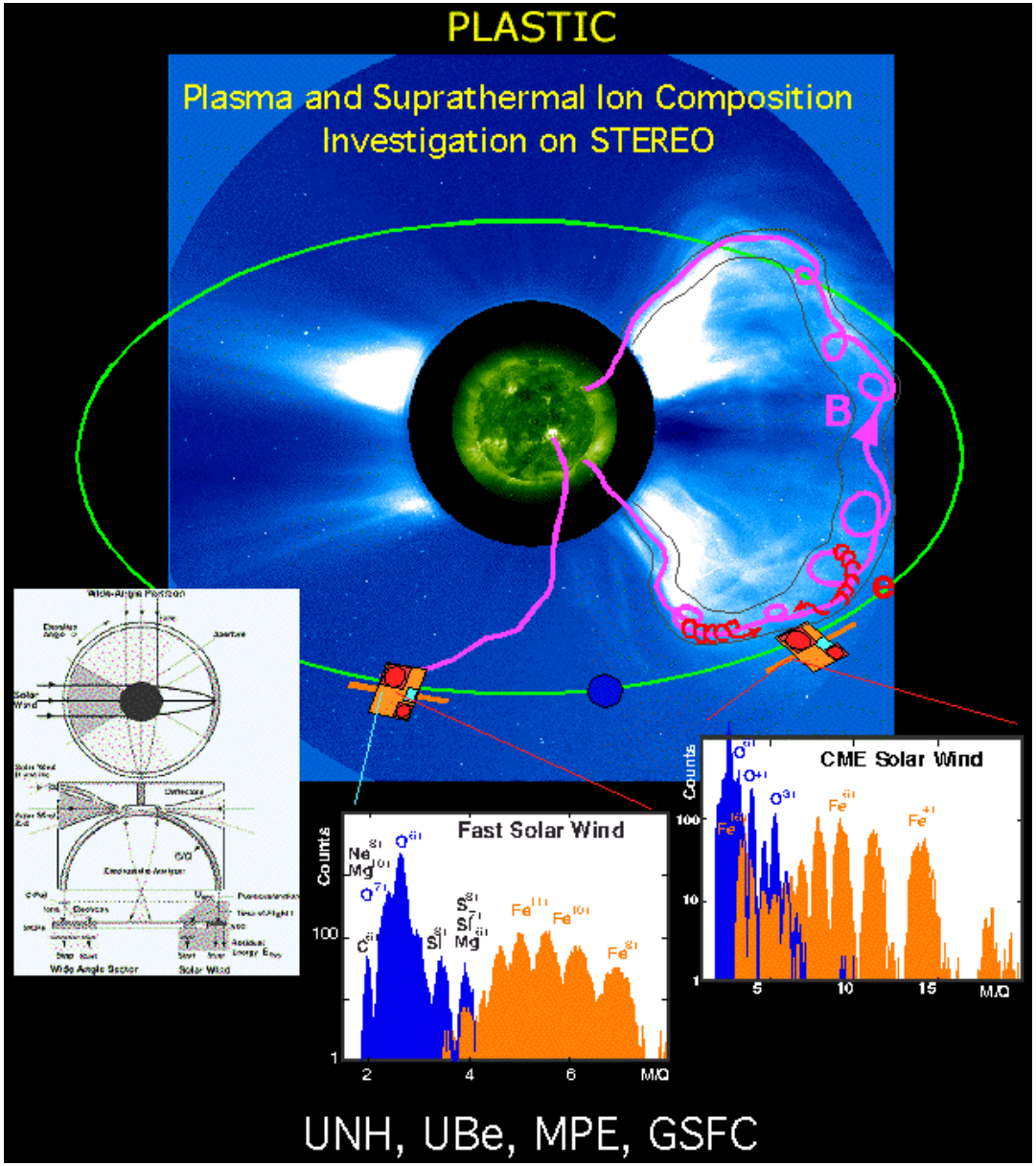
- **Space Weather Broadcast Latency**
  - **Onboard: 1 minute averages + 1 minute buffer**
  - **S/C Transfer Frame @500 bps ~21 seconds**
  - **Light-Travel Time (variable, see plot)**
  - **Antenna Site: 1 minute buffering(?)**
  - **Packaging for transfer to SSC (1 minute)**
  - **Internet Transfer (variable, seconds to hours)**
  - **SSC Processing & Update (1 minute)**

- **Typical Latency ~ 5 minutes + Light Travel**

STEREO Space Weather Broadcast

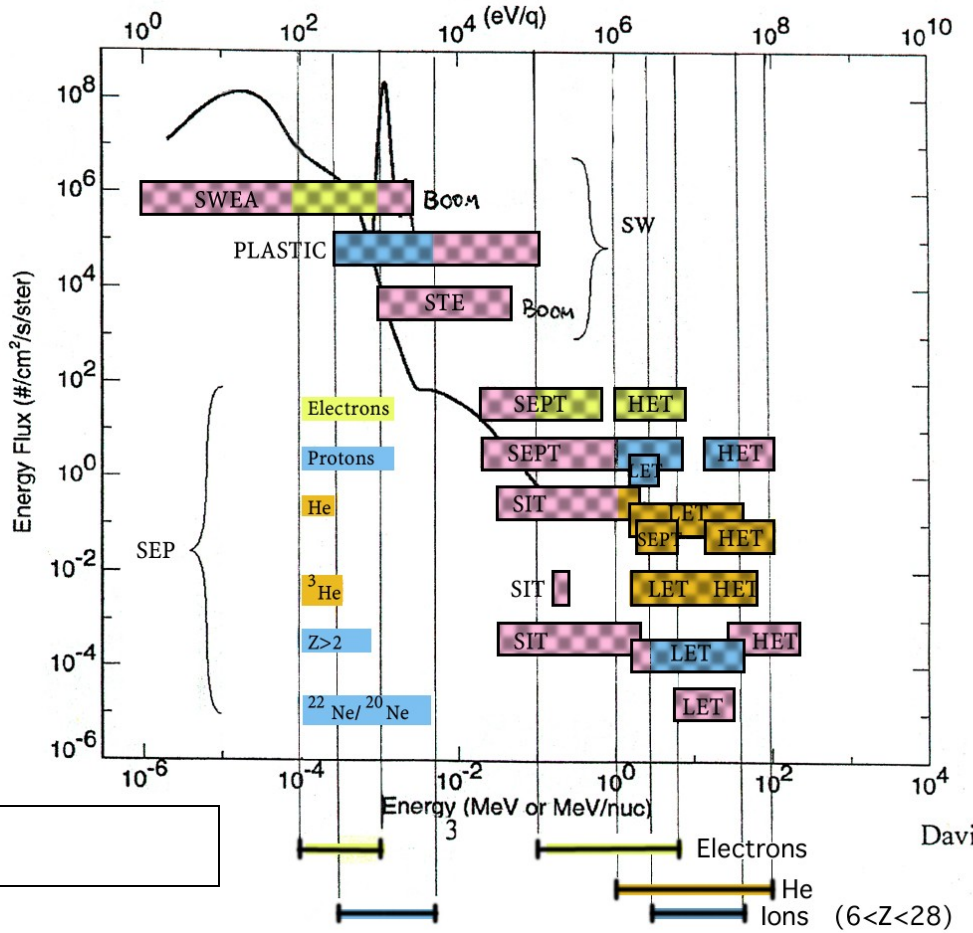


CStCyr--May2001

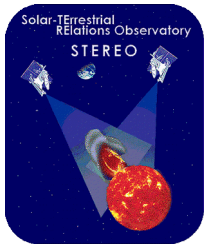


CStCyr--May2001

IMPACT / PLASTIC Energy Coverage

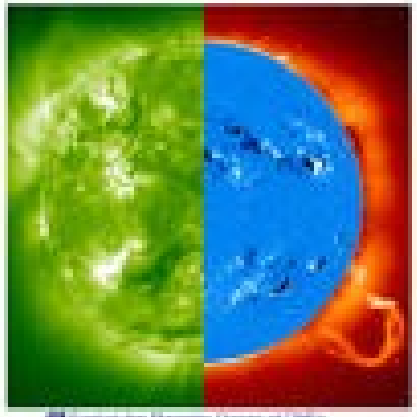


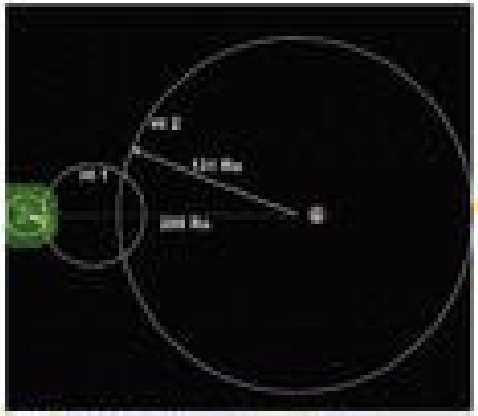
David Curtis

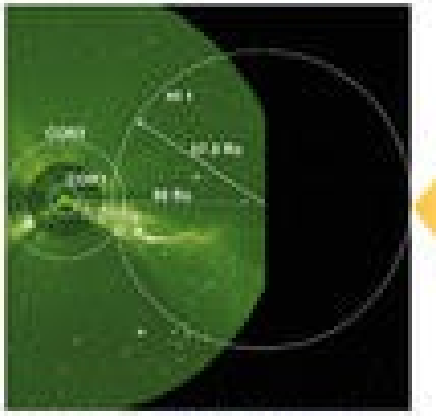


SECCHI Exploration of CMEs and the Heliosphere on STEREO

- *What Configurations of the Corona Lead to a CME?*
- *What Initiates a CME?*
- *What Accelerates CMEs?*
- *How Does a CME Interact With the Heliosphere?*
- *How do CMEs Cause Space Weather Disturbances?*







CStCyr--May2001